

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 1, 2010 has been entered.

As requested by the RCE submission of December 1, 2010, the after final amendment of October 21, 2010 has been entered. With the entry of the amendment, claims 4 and 8 are canceled, and claims 1-3, 5-7 and 9-11 are pending for examination.

Claim Objections

2. Claims 1 and 5 are objected to because of the following informalities: in claim 1, line 11 and claim 5, line 12, "hydrofluoric" is misspelled as "hydrorfluoric".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 5-7, 9 and 11 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a process where the ozone and irradiating occur before the electrolessly plating, does not reasonably provide enablement for a process where the ozone and irradiating can occur after the electroless plating. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims.

As described in the specification as filed, the process is to pretreat the substrate with the ozone/irradiation to prepare for plating (see paragraph [0019] of the specification as filed), and it is unclear how the process would work if the ozone/irradiation occurred after plating. One of ordinary skill in the art would have to perform undue experimentation to test every possible treatment with ozone and irradiation after plating to see what, if anything, worked. The Examiner suggests that in claim 5, line 5, after "and", "then" should be inserted to show that the claimed steps are sequential.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-3, 5-7 and 9-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, lines 1-2, "A pretreatment method for an electroless plating material" is confusing as to what is intended in the preamble, as there is no connection between this requirement in the preamble and any of the described steps of the claim. The Examiner suggests wording the phrase as "A pretreatment method for a resin material to be electrolessly plated ~~an electroless plating material~~", and in line 3, changing "a resin material" to "the resin material" to provide such a connection. Claim 2, 3 and 10 should be corrected to provide such features in the preamble as well.

Claim 1, lines 4-5 and 10-11; lines 4-5 requires "a first solution consisting of ozone in an organic or inorganic polar solvent other than water", and lines 10-11 provide that the inorganic polar solvent can be "hydrochloric acid" or "hydrofluoric (understood to be hydrofluoric) acid". However, as noted in the provided definitions for hydrochloric acid and hydrofluoric acid from Answers.com, these acids are provided as aqueous solutions of hydrogen chloride and hydrogen fluoride, respectively, and therefore, it is unclear how hydrochloric acid and hydrofluoric acid can be inorganic polar solvents "other than water" (with the "consisting of" requirement of the first solution excluding other sources of water). It is further unclear what amount of hydrogen chloride or hydrogen fluoride would be necessarily provided, and therefore, as worded, extremely dilute solutions, such as 0.0001 wt% hydrogen chloride

or hydrogen fluoride or less could be provided, indicating that the "hydrochloric acid" and "hydrofluoric acid" as claimed would be inclusive of what is effectively simply aqueous solutions.

Claim 5, lines 4-5 and 11-12; line 4-5 requires "a first solution consisting of ozone in an organic or inorganic polar solvent other than water", and lines 10-11 provide that the inorganic polar solvent can be "hydrochloric acid" or "hydrofluoric (understood to be hydrofluoric) acid". However, as noted in the provided definitions for hydrochloric acid and hydrofluoric acid from Answers.com, these acids are provided as aqueous solutions of hydrogen chloride and hydrogen fluoride, respectively, and therefore, it is unclear how hydrochloric acid and hydrofluoric acid can be inorganic polar solvents "other than water" (with the "consisting of" requirement of the first solution excluding other sources of water). It is further unclear what amount of hydrogen chloride or hydrogen fluoride would be necessarily provided, and therefore, as worded, extremely dilute solutions, such as 0.0001 wt% hydrogen chloride or hydrogen fluoride or less could be provided, indicating that the "hydrochloric acid" and "hydrofluoric acid" as claimed would be inclusive of what is effectively simply aqueous solutions.

Claim 10, line 2, the organic polar solvent is limited, but applicant has not clarified in the claim that it is the organic polar solvent that must be used, so it is unclear as to what is intended. The Examiner suggests wording line 2 as "... in claim 1, wherein the first solution consists of ozone in the organic polar solvent, and the organic . . ." to clarify what is required. For the purpose of examination, the claim has

been treated as having the suggested wording, however, applicant should clarify what is intended, without adding new matter.

Claim 11, line 2, the organic polar solvent is limited, but applicant has not clarified in the claim that it is the organic polar solvent that must be used, so it is unclear as to what is intended. The Examiner suggests wording line 2 as ". . . in claim 5, wherein the first solution consists of ozone in the organic polar solvent, and the organic . . ." to clarify what is required. For the purpose of examination, the claim has been treated as having the suggested wording, however, applicant should clarify what is intended, without adding new matter.

The other dependent claims do not cure the defects of the claims from which they depend.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were

made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 1-3, 5-7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Asakura et al (Japan 10-088361, hereinafter Asakura) in view of Iwasa et al (US 5803131) and Mayne (US 4437999).

Claims 1, 5: Asakura teaches a method of pretreating before electroless plating (paragraph [0006]). A resin material is irradiated with ultraviolet rays before electroless plating to help increase adhesion of the plating, by helping to oxidize and degrade the surface of the polymer (paragraphs [0006]–[0009]). No roughening treatment is required on the surface of the resin before the UV treatment (paragraphs [0003], [0004], [0010], [0015] and Table 1). After the UV treatment, electroless plating is provided. Paragraph [0014].

Asakura does not teach that the UV treatment is done while the resin material is in contact with a first solution consisting of ozone and a specific solvent as claimed, such as hydrochloric or hydrofluoric acid. However, Iwasa teaches that a polymer surface can be desirably oxidized to prepare the surface for electroless plating by contacting the surface with an aqueous ozone solution (column 9, lines 45-65, column

10, lines 10-15, column 11, line 65 through column 12, line 35, providing a solution made up of ozone and a first inorganic polar solvent, water). Mayne further teaches that it is well known that simultaneously treating an organic resin material with a first aqueous solution containing ozone and UV light has the physical effect of oxidizing the resin, with the ultraviolet light serving to enhance appreciably the oxidation rate accomplished by the ozone (column 1, lines 5-20 and 55-65, column 2, lines 35-45, and column 4, lines 45-55). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Asakura to further provide that the resin material is in contact with an ozone solution as suggested by Iwasa and Mayne during the UV irradiation to provide a beneficial increased oxidation rate for speedy processing, as Asakura and Iwasa both teach the desire to oxidize resin surfaces before electroless plating, using UV treatment and an ozone solution, respectively, and Mayne teaching that the combination of these treatments would be expected to provide a beneficial enhanced oxidation rate. The references do not teach to use hydrochloric or hydrofluoric acid as the solvent (rather than water), however, as discussed in the 35 USC 112 rejection above, since hydrochloric acid is hydrogen chloride in water, and hydrofluoric acid is hydrogen fluoride in water, with no limitation as to how dilute the hydrogen chloride or hydrogen fluoride can be, the use of hydrochloric acid or hydrofluoric acid as claimed would essentially overlap with a simply aqueous solution as described by Iwasa and Mayne and the same results would be expected.

Although applicant asserts unexpected results summarized in Table 1 of the specification, these results are not commensurate in scope with these claims to show that the results occur over the entire claimed range (see MPEP 716.02(d)). For example (1) applicant's table provides one example of nitric acid (and does not say how much/strength is used -- i.e. is the solution 100% nitric acid, 60% nitric acid/40% water, etc.) and one example of ethanol (and does not say if this is entirely ethanol), while applicant's claims claim a specific list of organic or inorganic polar solvents (that does not include ethanol) with no indication that the same results will occur for every inorganic/organic solvent listed; (2) applicant claims a resin material in general can be treated, but only uses an ABS substrate in the examples, with no indication that the same results will occur for every resin.

Claims 2-3 and 6-7: Asakura further teaches that after the UV treatment, the resin material is brought into contact with a second solution containing an alkaline component and a nonionic surface active agent (surfactant) to help improve plating adhesion (paragraphs [0005] – [0006], [0011] and [0013]).

Claim 9: After the electroless plating step, Asakura indicates that an electroplating step can be provided (paragraph [0017]). Iwasa further indicates that it is conventional to provide an electroplating step after electroless plating (column 10, lines 10-15).

10. The rejection of claims 1-3, 5-7 and 9 under 35 U.S.C. 103(a) as being unpatentable over Asakura et al (Japan 10-088361, hereinafter Asakura) in view of Iwasa et al (US 5803131), Mayne (US 4437999), Hattori et al (Japan 11-244360, hereinafter Hattori) and Inoue (Japan 55-145620, hereinafter Inoue) is withdrawn due to applicant's arguments and amendments of October 21, 2010 as to the use of methanol as a solvent.

11. The rejection of claims 1-3, 5-7 and 9-11 under 35 U.S.C. 103(a) as being unpatentable over Asakura et al (Japan 10-088361, hereinafter Asakura) in view of Iwasa et al (US 5803131) and Nakajima et al (Japan 2002-025971, hereinafter Nakajima) is withdrawn due to applicant's arguments and amendments of October 21, 2010 as to the use of acetic acid as a solvent.

Allowable Subject Matter

12. Claims 10 and 11 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, first and 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The prior art does not provide the suggestion to provide a first solution consisting of the specific listed organic polar solvents and ozone (thereby excluding water), since the cited prior art provides the teaching and suggestion to use aqueous solutions.

Response to Arguments

13. Applicant's arguments with respect to claims 1-3, 5-7 and 9-11 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:00-3:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy H. Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Katherine A. Bareford/
Primary Examiner, Art Unit 1715